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BEFORE THE ARIZONA CORPORATION COMMISSION

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IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY FOR APPROVAL OF THE COMPANY'S 2011 DEMAND SIDE MANAGEMENT IMPLEMENTATION PLAN	DOCKET NO. E-01345A-10-0219 **COMMENTS ON STAFF'S PROPOSED ORDER**

Introduction

On June 1, 2010, Arizona Public Service Company ("APS" or "Company") filed an Application for approval of the Company's 2011 Demand Side Management Implementation Plan ("2011 Plan"). The 2011 Plan was filed in compliance with provisions of the Settlement Agreement in the Company's most recent rate case approved by the Arizona Corporation Commission ("Commission") in Decision No. 71448 (December 30, 2009).

On December 23, 2010, Utilities Division Staff ("Staff") filed its fourth Memorandum and Proposed Order in this docket, which addressed APS's proposed Non-Residential new measures and program changes. Specifically, Staff's Proposed Order deals with five separate initiatives, as proposed by APS: 1) changes to Customer Caps; 2) changes to Measure Caps; 3) new Non-Residential measures; 4) expansion of Direct Install eligibility; and 5) expansion of financing to all Non-Residential customers. APS is filing these comments in response to Staff's Proposed Order.

APS is in agreement with many of the conclusions reached by Staff in the Proposed Order. However, APS strongly disagrees with Staff's recommendations to deny approval for the Measure and Customer Cap increases, as well as some of the new Non-Residential Measures—all of which enhance APS's DSM efforts to meet the energy efficiency goals established by the Commission. All measures within the APS implementation plan are cost-effective. The Company also strongly opposes Staff's additional recommendations to (1) lower existing prescriptive Measure Caps, and to (2) prevent the Non-Residential programs from allowing the replacement of gas appliances with high efficiency electric appliances even though the customer has made an independent decision to switch from gas to electric.

APS urges the Commission to approve the Company's proposed Non-Residential Measure Cap increases, Customer Cap increases, the Coin-Operated Clothes Washer Measures, and the Window Film Measure. Exhibit A provides APS's Proposed Amendments to the Proposed Order.

Electric Energy Efficiency Rules: Energy Efficiency Standard

The programs, measures, and measure enhancements proposed in APS's 2011 Plan outline the Company's plan to meet the energy savings goals of the Electric Energy Efficiency Rules ("EE Rules") for 2011 and beyond. APS anticipates that it will achieve its 2010 energy savings goal. However, the Company will face ever-greater challenges in meeting future goals because the EE Rules contain growing energy savings goals each year and the level of energy efficiency being achieved from measures that cannot be counted or fully counted against the demands of the EE Rules (e.g., general increases in electric appliance efficiency) will constantly raise the bar for APS's energy efficiency programs. For example, in 2010, the goal was 1.0 percent of the Company's retail electric sales. That percentage grows to 1.25 percent in 2011 and 1.75 percent in 2012. By 2016, APS will need to achieve cost-effective energy savings in that year alone equivalent to 2.5 percent of retail electric sales. In other words, an increase in savings by a factor of 2.75 times is necessary to meet the EE Rules in the next six years. Put yet another way, the savings achieved in 2010 was enough energy to power approximately 23,000 typical Arizona homes for one year; whereas, the savings necessary in 2016 will be enough energy to power 63,000 homes.

Achieving this significant increase in energy savings will require that most APS customers take definitive energy efficiency actions. In addition, APS must ensure that customers' decisions relating to equipment purchases and facility upgrades are influenced by APS's DSM programs. To accomplish this, customer participation must expand significantly over the next few years, and APS must offer incentives that truly influence customer decisions while still being cost-effective. The proposed programs position APS to meet future energy savings goals. It is for these reasons that APS has proposed the cost-effective measures and enhancements contained in its 2011 Plan.

Measure Caps Should Be Raised, Rather Than Decreased, To Meet EE Goal

In its 2011 Plan, APS proposed that the Measure Caps be increased for the Retro-Commissioning and Custom measures from 50 percent to 75 percent of incremental cost to maximize cost-effective energy savings. The Proposed Order recommends that APS continue to impose an incentive cap of 50 percent, and to reduce the existing cap on prescriptive measures from 75 percent to 50 percent of incremental cost. Staff's Proposed Order does not provide convincing rationale to support its recommendations.

Staff's recommendation to reduce the cap on prescriptive measures and to maintain the current 50 percent cap on the Retro-Commissioning and Custom measures would result in lower incentives, which would then lower customer participation in the program and result in lower energy savings. Yet, increased (not decreased) customer participation is paramount for APS to reach its aggressive and accelerating energy efficiency goals. Staff's proposal falsely assumes that setting all caps at 50 percent will promote a level of program activity that would result in increased cost-effective energy savings. APS disagrees with that assumption.

The Company's position that increasing the Measure Caps will attract more customer participation is supported by an independent study[1] commissioned by APS. This study evaluated the Custom Incentive measure offered by APS to determine the appropriate level of incentive offered and to benchmark the APS incentive against other utilities in various jurisdictions. The APS Custom Incentive Analysis Report (the "Report") (attached hereto as Exhibit B), demonstrated that raising the custom efficiency Measure Caps from 50 percent to 75 percent of incremental cost would increase market acceptance by eight percent.[2] One

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[1] The Commission ordered APS to conduct an analysis of custom incentives (with the assistance of Commission Staff and the DSM Collaborative) in Decision No. 70637 (Nov. 12, 2008).

[2] *APS Custom Incentive Analysis Report*, at 15, Figure 3-4 (Market Acceptance vs. Incentive Amount/Payment Caps) (filed in Docket No. E-01345A-05-0477 (Apr. 1, 2009)). Based on projected participation in the

would expect a similar impact in the opposite direction if the prescriptive percentages were reduced.

Contrary to Staff's position, APS continues to urge the Commission to approve APS's proposal to raise the Retro-Commissioning and Custom measure cap from 50 percent to 75 percent and to deny the recommendation to lower the prescriptive measure cap from 75 percent to 50 percent.

Customer Caps Must Be Raised To Increase Energy Efficiency

In its 2011 Plan, APS proposed that the Non-Residential Large Existing and New Construction program Customer Caps be raised from $300,000 to $1 million per customer per year. APS further proposed that once the Customer Cap is reached, the customer receive incentives at 50 percent of the published incentive level. Staff recommended not to adopt APS's proposals.[3]

The purpose of Customer Caps in the programs' early years was to ensure that not any one customer would use the majority of the budgeted incentives. The original Customer Caps were set at $300,000 when the total Non-Residential annual incentive budget was $3.5 million. The cap at that time represented nine percent of the total Non-Residential annual incentive budget. The 2011 Plan's total Non-Residential annual incentive budget is now $16 million. The proposed new $1 million cap represents only six percent of the total Non-Residential annual incentive budget and, therefore, would still support the original objective to not allow any one customer to receive a majority of the available incentives.

It is important that APS continue to aggressively pursue every kWh of cost-effective energy savings available. Establishing arbitrary caps hinders APS's efforts to achieve all of the energy efficiency savings that are available. For example, if the Customer Caps are not raised, a customer that completes an energy efficiency project with a $500,000 incremental cost who receives a $300,000 incentive would not be eligible for further incentives later in the

Custom Efficiency measures in 2011, an eight percent increase in market acceptance would equate to an additional net savings of 2,600 MWh. This is for Custom Efficiency only.

[3] This recommendation was not included in the ordering language of the Proposed Order.

same year due to the $300,000 Customer Cap. Hence, a second energy efficiency project may not be pursued. It is important for APS to encourage its customers to install comprehensive packages of cost-effective measures to achieve maximum energy efficiency.

Many APS customers have been counting on this increased Customer Cap for upcoming energy efficiency projects. For example, K-12 schools, universities, and municipalities are now considering large multi-million dollar energy efficiency projects by leveraging funds available from the federal American Recovery and Reinvestment Act. These large projects may not materialize unless the Customer Cap is raised. APS is depending on large customer projects to yield significant cost-effective savings in its DSM portfolio.

APS strongly urges the Commission to raise the Non-Residential Customer Caps from $300,000 to $1 million, and to approve APS's proposal to pay incentives at 50 percent of the published level after reaching the cap.

Coin-Operated Clothes Washer Measures and Window Film Measure Are Cost-Effective

Staff's Proposed Order would approve many of the proposed new Non-Residential measures, but recommends that the Coin-Operated Clothes Washer measures and the Window Film measure be disallowed based on the results of Staff's Societal Cost Test calculations. APS, however, found these measures to be cost-effective using its industry-standard cost-effectiveness model. The difference in the results between Staff and APS's are twofold: 1) Staff and APS use different assumptions when applying the Societal Cost Test; and 2) there are differences in Staff's and APS's models and several model inputs. These differences typically result in Staff's model reporting lower benefit cost ratios. Factors that contribute to Staff's lower Societal Cost Test results are (1) Staff's use of an "out of range"[4] Societal

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[4] The DSM Collaborative "White Paper" calls for a Societal Discount Rate based on the yield for U.S. Treasury Securities up to a cap of four percent. Staff uses a 7.53 percent Societal Discount Rate, which reflects a significant default premium. This premium paid by the borrower to the lender, although very real to them, is simply not a societal cost.

Discount Rate, and (2) the fact that Staff does not place a value on avoided capacity costs for the years until a new generation unit is planned.[5]

Members of the DSM Collaborative Group, which was created by the Commission pursuant to Decision No. 67744 (April 7, 2005), have prepared a White Paper[6] on a standard cost-effectiveness test model (Societal Cost Test) and a set of measurement inputs, or input standards, which could be adopted by both Staff and the electric utilities. Such a mechanism could eliminate duplication of effort and assure utilities that Staff would only find the utility's pre-screened measures not to be cost-effective if they disagreed significantly with the inputs provided by the utility during Staff's independent review of the utility's analysis. This would save time and effort on the part of both Staff and electric utilities.

APS urges the Commission to approve the Company's proposed Coin-Operated Clothes Washers measures and the Window Film measure.

Electric Energy Efficiency Rules: Fuel Neutrality Provisions

APS understands and agrees with the general objective of limiting the use of DSM dollars for fuel switching either from electric to natural gas or from natural gas to electric.[7] However, it is important to recognize that some electric customers will make an independent decision to switch from a gas appliance to an electric appliance. APS believes that if the customer makes the decision to switch, it is important that the customer be incentivized to choose the most energy-efficient option.

APS urges the Commission to adopt the Company's amendment consistent with the Company's position on this issue, attached hereto as Exhibit A.

Conclusion

In its 2011 DSM Plan, the Company proposed its best strategies to meet the aggressive energy savings goals in the EE Rules. After careful analysis and much scrutiny, APS selected

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[5] APS and other DSM Collaborative Members use a market value approach that recognizes that there is a value for avoided capacity cost in the early years before the next planned generation unit is to become commercial.

[6] Memorandum to DSM Collaborative from UniSource Energy & APS, Arizona Benefit/Cost Analysis of DSM Programs Memo No. 1 (October 1, 2010).

[7] APS supports the fuel neutrality provisions of the Energy Efficiency rules. *See* A.A.C. R14-2-2401(22) and A.A.C. R14-2-2414.

only the most effective new programs, measures, and program modifications to expand and enhance its portfolio. Staff's Proposed Order, however, would approve only two and a portion of a third of five APS proposed Non-Residential program initiatives. Further, it would reduce the existing Measure Cap on prescriptive measures.

APS urgently needs each of the DSM program enhancements in the 2011 Plan to expand its DSM activities and cost-effective energy savings to meet the EE Standard. Therefore, APS strongly urges the Commission to approve all of the APS proposed Non-Residential DSM initiatives, to deny reducing the existing cap on prescriptive measures, and to adopt APS's Proposed Amendments, attached hereto as Exhibit A.

RESPECTFULLY SUBMITTED this 7th day of January 2011.

PINNACLE WEST CAPITAL CORPORATION
LAW DEPARTMENT

By: Linda J. Arnold
Thomas L. Mumaw
Linda J. Arnold
Attorneys for Arizona Public Service Company

ORIGINAL and thirteen (13) copies
of the foregoing filed this 7th day of
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Docket Control
ARIZONA CORPORATION COMMISSION
1200 West Washington Street
Phoenix, Arizona 85007

COPIES of the foregoing sent via email and/or
mail this 7th day of January 2011, to:

All Parties of Record

Kim Cosme

Copy of the foregoing mailed/delivered this 7th day of January, 2011, to:

Cynthia Zwick
1940 E. Luke Avenue
Phoenix, AZ 85016

David Berry
Western Resource Advocates
P.O. Box 1064
Scottsdale, AZ 85252-1064

Lyn Farmer
1200 West Washington Street
Phoenix, AZ 85007-2927

Janice Alward
Chief Counsel, Legal Division
1200 West Washington Street
Phoenix, AZ 85007

Steve Olea
Director, Utilities Division
1200 W. Washington St.
Phoenix, AZ 85007

Sandy Bahr
202 E. McDowel Rd, Ste 277
Phoenix, AZ 85004

EXHIBIT A

Arizona Public Service Company
Proposed Amendment #1

Application for Approval of Its
2011 Demand Side Management Implementation Plan
Non-Residential Items
Docket No. E-01345A-10-0219

TO RAISE MEASURE CAPS FROM 50% TO 75% OF INCREMENTAL COST

Page 18, Line 27, DELETE:

"not"

INSERT:

"are"

MAKE CONFORMING CHANGES AS NECESSARY.

Arizona Public Service Company
Proposed Amendment #2

Application for Approval of Its
2011 Demand Side Management Implementation Plan
Non-Residential Items
Docket No. E-01345A-10-0219

TO RETAIN PRESCRIPTIVE MEASURE CAPS AT THE CURRENT LEVEL OF 75% OF INCREMENTAL COST

Page 12, Line 16, INSERT NEW FINDING OF FACT #37:

> "However, we conclude that that leaving the caps unchanged and raising the budget will not cause a greater number of Non-residential customers to participate in the Non-residential programs, and will not increase customer participation or energy savings."

Page 12, Line 18, INSERT:

> After "support" ADD "adoption of Staff's recommendation at this time."

DELETE REMAINDER OF SENTENCE

Page 19, Lines 1 – 3, DELETE:

> "IT IS FURTHER ORDERED that measure caps be set at 50% of the incremental costs for prescriptive, custom and retro-commissioning measures, making the level of incentive for all these types of measures consistent."

MAKE CONFORMING CHANGES AS NECESSARY.

Arizona Public Service Company
Proposed Amendment #3

Application for Approval of Its
2011 Demand Side Management Implementation Plan
Non-Residential Items
Docket No. E-01345A-10-0219

TO RAISE CUSTOMER CAPS FROM $300,000 TO $1,000,000

Page 19, line 6, INSERT NEW ORDERING PARAGRAPH:

> "IT IS FURTHER ORDERED that the customer caps be raised from the current level of $300,000 to $1,000,000 per customer per year.

MAKE CONFORMING CHANGES AS NECESSARY

TO PAY INCENTIVES AT 50% OF THE PUBLISHED LEVEL AFTER REACHING THE CUSTOMER CAP

Page 19, Line 6, DELETE:

> "not be paid once"

Page 19, Line 6, INSERT:

> "be paid at 50% of the published level after"

MAKE CONFORMING CHANGES AS NECESSARY.

Arizona Public Service Company
Proposed Amendment #4

Application for Approval of Its
2011 Demand Side Management Implementation Plan
Non-Residential Items
Docket No. E-01345A-10-0219

TO APPROVE THE COIN OPERATED WASHER MEASURES AND THE WINDOW FILMS MEASURE:

Page 18, Lines 12 – 13, DELETE:

> ", with the exception of the Coin Operated Washer measures and the Window Films measure."

MAKE CONFORMING CHANGES AS NECESSARY.

Arizona Public Service Company
Proposed Amendment #5

Application for Approval of Its
2011 Demand Side Management Implementation Plan
Non-Residential Items
Docket No. E-01345A-10-0219

TO CLARIFY THE FUEL SWITCHING RESTRICTION

Page 18, Lines 20 – 21, DELETE:

> "IT IS FURTHER ORDERED that the Non-residential programs shall not be used to replace gas appliances with electric appliances."

INSERT:

> "IT IS FURTHER ORDERED that the Non-residential programs shall not be used to replace gas appliances with electric appliances unless the customer has already made the decision to replace gas with electric."

MAKE CONFORMING CHANGES AS NECESSARY.

EXHIBIT B

APS CUSTOM INCENTIVE ANALYSIS REPORT

April 1, 2009

SUMMIT BLUE
CONSULTING, LLC

Submitted to:

Roger Krouse
APS
400 N. 5th Street
Mail Station 8666

Submitted by:

Summit Blue Consulting, LLC
1722 14th Street, Ste. 230
Boulder, CO 80302
720.564.1130

Prepared by:

Marshall Keneipp
720.564.1130
MKeneipp@summitblue.com

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E Executive Summary

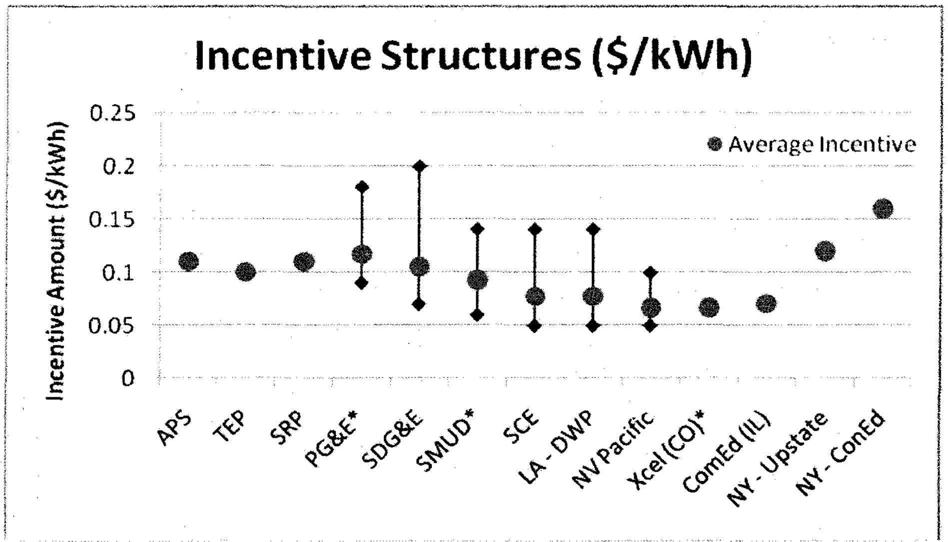
During the ACC Open Meeting regarding the Solutions for Business 13 Month filing, staff recommended that the custom incentive be reduced based on keeping consistent with other utility programs in the state and the perception that the custom projects were being accepted in the market place and did not require the current level of incentive. After some discussion, it was agreed that further study of the custom incentive was in order. Per ordering paragraph 12 in the Arizona Corporation Commission (ACC) Decision No. 70637, APS held meetings with the ACC Staff and DSM Collaborative group to solicit input into the custom incentive analysis required in the order. Thus, a Collaborative meeting was held on January 12 to establish the custom incentive analysis methodology. As a result of this meeting, APS requested that Summit Blue Consulting evaluate the custom incentive measure offered by APS to determine the appropriate level of incentive offered, and to benchmark the APS incentive against other utilities in various jurisdictions. A second Collaborative meeting was held on March 17th of 2009 to review the custom incentive measure analysis findings. The collaborative meetings resulted in a robust discussion and produced a number of useful ideas for future consideration related to the design of custom incentives for both existing facilities and new construction projects. All collaborative members agreed that this analysis met the requirements of Decision No. 70637.

This report is divided into three main research areas. First, a review of custom incentives offered by other utilities is presented. Service territories include those in Arizona, California, Colorado, and other areas, including the Midwest, and the Northeast. Second, an analysis of the current incentive structure offered by APS is presented. Areas highlighted in the analysis include statistical information of current custom projects, research linking project payback periods to market acceptance rates, and a parametric analysis of incentive levels and cap limitations to identify optimal incentive structures for achieving a target market acceptance of 50%. Finally, alternatives to the current custom incentive offering for non-residential new construction projects, encompassing various measures and an integrated whole building design approach, was examined at a high level for the APS service territory.

E.1 Custom Incentive Benchmarking Study Summary

A summary of custom incentive levels offered by the Arizona, California and other selected utilities from around the country is presented in Figure E-1. In Arizona, APS and Salt River Project (SRP) have comparable incentive offerings of $0.11/kWh, with Tucson Electric Power (TEP) at $0.10/kWh. Compared to California utilities, the incentive levels offered by APS are on par with several of the major utilities in California, including PG&E and SDG&E. California incentives for existing customers are applied by end use category and range from $0.05/kWh to an equivalent of $0.20 when both demand and energy incentives are considered. On an average basis across all end use applications, California incentives range from $0.08/kWh to $0.12. Compared to other utilities around the country, APS again is also within the range between the high and low offerings. In other parts of the country, the incentive rate ranges from $0.07/kWh in Colorado and Illinois up to $0.16/kWh in New York.

Figure E-1: Custom Incentive Levels for All Utilities[1]



E.2 APS Custom Incentive Analysis Summary

The review of the APS custom incentive program was divided into three parts. First, a review of program participation activity to date was conducted. Second, the relationship between payback period and market acceptance was explored. Finally, the two were combined to present a parametric analysis on how incentive structure affects market acceptance, with the ultimate goal of defining an optimal incentive offering.

On the basis of this analysis, the current incentive structure of $0.11/kWh with a cap of 50% of incremental costs yields a customer payback of 2.5 years and a Total Resource Cost (TRC) score of 2.67. The customer payback currently being realized through the custom incentive is not reaching APS' goal of two years or less. The average effective incentive paid to customers is currently limited by the incentive cap and averaged $0.093/kWh.

The target market acceptance level for the custom incentive program is 50%,[2] which is in line with a payback for customers of two years or less. To determine an effective incentive structure, a parametric analysis was conducted while maintaining the 50% of incremental cost cap using the ICF International payback acceptance curve used in the Market Potential Study. The analysis shows that the current

[1] Utilities marked with an asterisk include demand incentives. High and low bars represent the range of the incentives offered by the utility.

[2] Assuming a standard S-shaped diffusion curve and 100% technical market potential for the custom incentive program, the goal of 50% market acceptance signifies the midpoint between program growth and program saturation. Furthermore, this is the rate at which market diffusion is increasing most rapidly. Thus, a market acceptance of 50% is deemed an appropriate goal.

incentive level ($0.11/kWh at 50% cap) achieves a market acceptance of 35%. However, with a cap of 75%, the current incentive level provides 37.5% acceptance and has the potential to reach 44.8% of the market.

Thus, we conclude that in order to move toward a goal of 50% market acceptance, it would be necessary to raise both the incentive level and the cap. If it is not desirable to raise the incentive level, at a minimum, the project team recommends that the current incentive level be maintained and the cap be raised to 75% to be consistent with the prescriptive design criteria. As an alternative for future consideration, APS may also want to examine options, such as keeping the cap at 50% for lighting projects, but increasing it to 75% for non-lighting projects or provide a tiered incentive system structure by end use application, adjusting the custom incentive for existing facilities.

E.3 Comprehensive Building Design

An analysis of a progressive incentive offering for the integrated design and construction of efficient buildings that exceed ASHRAE 90.1-2004 was conducted. The integrated building design approach optimizes energy consumption by integrating the design of the building envelope, HVAC systems, and lighting systems into new construction projects. The analysis uses the *Savings by Design*[3] (SBD) program offered by five California utilities as an example, which provides increased incentive amounts based on the percent reduction of energy consumption compared to buildings built to code.

The analysis of a Comprehensive Building Design incentive shows a beneficial TRC and market acceptance values for an array of incentive levels and energy savings. An incentive system with two or more tiers or a progressive incentive similar to that used by the SBD program to encourage more energy efficient building design is well suited to this market. The project team recommends that as the New Construction and Major Renovation program matures, APS should consider options for revising the current new construction incentive for custom projects ($0.11/kWh) to provide a tiered or progressive incentive to promote whole building energy efficiency designs that exceed the ASHRAE 90.1 baseline. APS may also want to consider the option of providing incentives for the design team similar to the SBD program. These incentives are used to offset the additional time and effort required by design professionals incurred when assessing alternative high efficiency design options. Unless building owners recognize that additional effort is required to examine alternative energy efficient designs on the part of their design teams, and unless design professionals are compensated for their time, these alternatives will rarely be considered. It is common practice that the same typical or standard design approaches is adopted from project to project and that high efficiency alternatives to standard practice are typically not analyzed.

[3] www.savingsbydesign.com

1 INTRODUCTION

During the ACC Open Meeting regarding the Solutions for Business 13 Month filing, staff recommended that the custom incentive be reduced based on keeping consistent with other utility programs in the state and the perception that the custom projects were being accepted in the market place and did not require the current level of incentive. After some discussion, it was agreed that further study of the custom incentive was in order. Per ordering paragraph 12 in the Arizona Corporation Commission (ACC) Decision No. 70637, APS held meetings with the ACC Staff and DSM Collaborative group to solicit input into the custom incentive analysis required in the order. Thus, a Collaborative meeting was held on January 12th to establish the custom incentive analysis methodology. As a result of this meeting, APS requested that Summit Blue Consulting evaluate the custom incentive measure offered by APS to determine the appropriate level of incentive offered, and to benchmark the APS incentive against other utilities in various jurisdictions. A second Collaborative meeting was held on March 17, 2009 to review the custom incentive measure analysis findings. All collaborative members agreed that this analysis met the requirements of Decision No. 70637.

All collaborative members were invited to these meetings. Participating collaborative members included:

- APS
- ACC Staff
- Distributed Energy Association of Arizona (DEAA) (first meeting)
- Southwest Energy Efficiency Project (SWEEP)

The collaborative meetings resulted in a robust discussion and produced a number of useful ideas for future consideration related to the design of custom incentives for both existing facilities and new construction projects. Some of the discussion topics that arose during the collaborative meetings include:

- A comparison of the current APS custom incentive to those offered by other utilities around the country shows that it is on par with other utilities in Arizona and elsewhere. However, some Collaborative participants felt that the best comparisons were viewed to be those in the Southwest.
- The significant influence that the 50% of incremental project cost incentive cap has on the effective amount actually paid out to customers.
- The viability of the payback acceptance curve approach as a tool for assessing market acceptance of energy efficiency measures and the custom incentive offering in particular.
- How to set savings goals and estimate overall market penetration from the perspective of current cost-effectiveness analysis methods.
- Options for APS to consider as part of future revisions to the custom incentive aspect of the Solutions for Business program. Options discussed at a high-level include:

- Exploring an incentive that is tiered by end use category (e.g., lighting, AC/refrigeration) for existing facilities.

- Raising the project cap as a percent of incremental cost. Options discussed include raising the cap to 75% for all custom projects, or leaving it at the current level for lighting projects, but raising it to 75% for all other end-use measures.

- Further analyzing a tiered or progressive customer incentive for new construction projects for future consideration as a program offering and enhancement.

- Providing an incentive for the design team for new construction projects. This incentive would be beyond the current basic study incentives currently offered and could be used as a tool to influence efficiency decisions early in the design phase of construction planning.

- Consider re-structuring custom incentives by end use categories, to ensure appropriate incentives are paid by specific end-use categories, while continuing to provide sufficient incentive to move the market.

This report is divided into three main research areas. First, a review of custom incentives offered by other utilities is presented. Service territories include those in Arizona, California, Colorado, and other areas in the Midwest and the Northeast. Second, an analysis of the current incentive structure offered by APS is presented. Areas highlighted in the analysis include statistical information of current custom projects, research linking project payback periods to market acceptance rates, and a parametric analysis of incentive levels and cap limitations to identify optimal incentive structures for achieving a target market acceptance of 50%. Finally, an incentive offering for integrated building design for non-residential new construction projects, encompassing various measures, was examined at a high level for the APS service territory.

2 CUSTOM INCENTIVE BENCHMARKING REVIEW

The aim of the program review is to take a high level view of the incentive levels, eligibility requirements, limitations, and the terms and conditions of custom incentive programs offered by utilities. Our research is confined to Arizona California, Colorado, as well as various Midwest and East coast service territories. This research consists of a review of utility program documents and interviews with utility representatives.

2.1 Program Summaries

In Arizona, APS and Salt River Project (SRP) have comparable custom incentive offerings of $0.11/kWh, with Tucson Electric Power (TEP) at $0.10/kWh. Compared to California utilities, the incentive levels offered by APS are on par with several of the major utilities, including PG&E and SDG&E. California incentives for existing customers are applied by end use category and range from $0.05/kWh to and equivalent of $0.20 when both demand and energy incentives are considered. On a weighted average basis, across all end use applications, California custom incentives range from $0.08/kWh to $0.12. Compared to other utilities around the country, APS is also within the range between the high and low offerings. Our sample of Midwest and East coast utilities indicate incentive rate ranges from $0.07/kWh in Colorado and Illinois up to $0.16/kWh in New York.

A summary of custom incentive levels offered by the Arizona, California, and other selected utilities from around the country is presented in Table 2-1 and Figure 2-1. A more detailed presentation of program incentives and features for each of the programs is included in Appendix A.

Table 2-1: Custom Incentive Levels for All Utilities

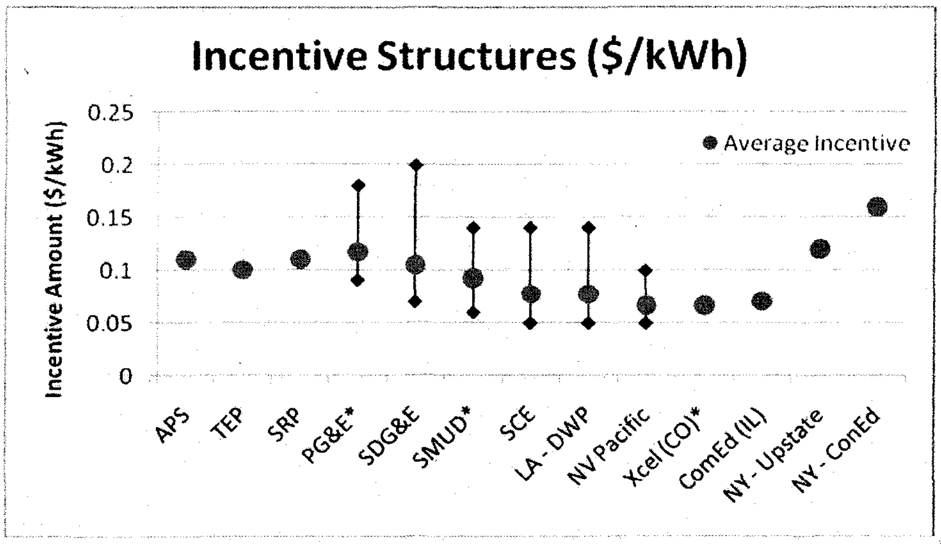
State	Utility	Incentive ($/kWh)	Incentive Cap
Arizona	Arizona Public Service	$0.11	50% of incremental cost
	Salt River Project	$0.11	50% of project cost
	Tucson Electric Power	$0.10	50% of incremental cost
California[4]	Pacific Gas & Electric	Range: $0.09 - $0.18 Average: $0.12	50% of project cost
	San Diego Gas & Electric	Range: $0.07 - $0.20 Average: $0.11	Up to 100% of project cost
	Sacramento Municipal Utility District	Range: $0.06 - $0.14 Average: $0.09	30% of project cost
	Southern California Edison	Range: $0.05 - $0.14 Average: $0.08	50% of measure cost
	Los Angeles Department of Water and Power	Range: $0.05 - $0.14 Average: $0.08	NA
Other	Nevada Pacific/Sierra Power (NV)[5]	$0.066	Tiered maximums up to100% of incremental cost
	Xcel Energy (CO)[6]	$0.07	NA
	Commonwealth Edison (IL)	$0.07	50% of project cost
	NYSERDA – Upstate New York	$0.12	50% of project cost
	NYSERDA – Con Edison	$0.16	50% of project cost

[4] Incentive values for CA utilities are effective values that account for demand reduction incentives ($/kW) and energy incentives based on measure type (i.e., HVAC, Lighting). See Appendix A for derivation.

[5] Nevada power offers an incentive of $0.10/kWh for on-peak and $0.05/kWh for off-peak. Their on-peak hours are 1:00 pm to 7:00 pm June 1 through Sept 30. This value assumes that 33% of the savings are realized during on-peak hours.

[6] Xcel offers demand reduction incentives only of up to $200/kW. This is an effective $/kWh value based on a load factor of 33%. See Appendix A for derivation.

Figure 2-1: Custom Incentive Levels for All Utilities[7]



2.2 Benchmarking Conclusions

The following are conclusions drawn from the custom incentive program benchmarking review.

- Incentive structures for Arizona utilities are similar with incentive levels ranging from $0.10/kWh saved for TEP and $0.11/kWh saved for APS and SRP. Since APS and SRP service territories are back-to-back, the current custom incentive offering of $0.11/kWh for both utilities is reasonable and still very close to TEP's offering of $0.10/kWh.

- California incentives for existing customers are applied by end use category and range from $0.05/kWh to and equivalent of $0.20 when both demand and energy incentives are considered. On an average basis across all end use applications, California incentives range from $0.08/kWh to $0.12. The APS incentive is on par with the incentives offered by PG&E and SDG&E.

- Compared to other utilities around the country, APS again is also within the range between the high and low offerings. In other parts of the country, the incentive rate ranges from $0.07/kWh in Colorado, Nevada, and Illinois up to $0.16/kWh in New York.

- APS DSM programs are designed around energy efficiency and, therefore, do not currently have a demand size or reduction requirement for participation, as seen in the PG&E and SMUD programs. In addition, Xcel and Nevada Power require a reduction in demand for an incentive to be paid.

- All programs reviewed include some form of cap on the incentive, typically ranging from 50% to 100% of project cost.

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[7] Utilities marked with an asterisk include demand incentives. High and low bars represent the range of the incentives offered by the utility.

3 APS Custom Incentive Program Analysis

The following section outlines the APS Custom Incentive program to date, highlighting the number of projects by measure type and the total amount of incentives paid. A discussion of research concerning payback acceptance rates is then discussed. Program data and payback acceptance research are then combined to determine a relationship between incentive structure and market acceptance.

3.1 APS Program Summary

The custom incentive database for program years 2006, 2007, and 2008 is summarized in this section. Program data from 2006 and 2007 was sourced from previous analysis conducted for the 2007 MER report for the Solutions for Business program. The analysis only considers completed custom projects. A summary of the number of custom incentive projects and the total incentive amounts paid are displayed in Table 3-1.

Table 3-1: Paid Custom Incentive Summary

Program Year	# of Projects	Total Incentives Paid
2006	22	$446,612
2007	219	$1,710,479
2008	134	$1,992,323
Total	375	$4,149,416

The custom incentive amount available is $0.11/kWh saved subject to a cap on paid incentives of 50% of incremental project cost. Due to the effect of the 50% cap on incremental costs, the average actual paid incentive was approximately $0.093/kWh. The distribution among customers by effective incentive rate is displayed in Table 3-2. This shows that approximately 50% of the custom incentives paid were below the maximum incentive due to the cap limitation.

Table 3-2: Distribution of Effective Incentive Level (2006-2008)

Incentive	Number of Customers		Paid Incentive Amount	
$/kWh	#	%	$	%
$0.11 and up	178	47%	$2,116,130	51.0%
$0.10 to $0.11	33	9%	$347,290	8.4%
$0.09 to $0.10	22	6%	$392,988	9.5%
$0.08 to $0.09	52	14%	$477,685	11.5%
$0.07 to $0.08	25	7%	$415,847	10.0%
$0.06 to $0.07	13	3%	$61,166	1.5%
$0.05 to $0.06	8	2%	$67,038	1.6%
$0.04 to $0.05	15	4%	$174,131	4.2%
$0.03 to $0.04	10	3%	$62,700	1.5%
$0.02 to $0.03	2	1%	$622	0.0%
$0.01 to $0.02	8	2%	$25,842	0.6%
$0.00 to $0.01	9	2%	$7,970	0.2%
Total	375	100%	$4,149,416	100.0%

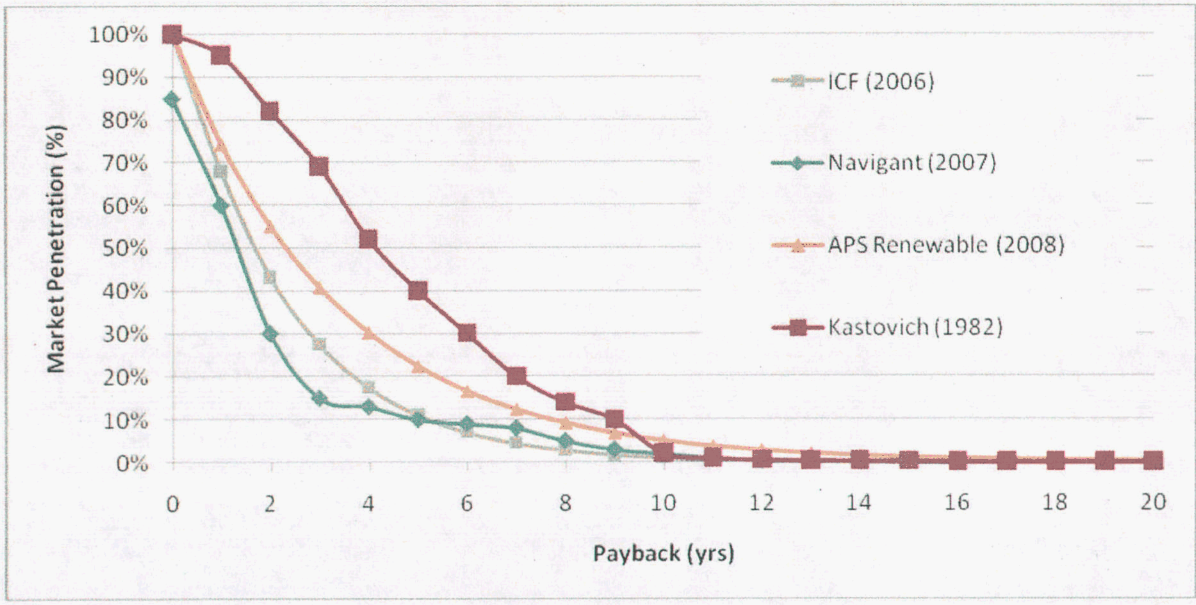
3.2 Payback vs. Market Acceptance

The intent of an incentive program is to provide an up-front incentive to offset the first cost of a project to the point where most customers would choose to invest in a project. In the original portfolio plan filing, the custom measure incentive level was set to move most customers that are presented with a viable energy efficiency project to invest in this project. Market Acceptance is defined as the percentage of the population that participates in a project or program. A value of 50% (or greater) market acceptance would be the point where most customers would accept a project.

Market acceptance is often linked to the amount of time required to recoup the expense of implementing energy efficient technologies, known as **Payback Period**. Payback period is linked to market acceptance through a relationship defined for purposes of this report as **Payback Acceptance**. This section explores various estimates of payback acceptance. The ultimate goal is to determine the success of the custom incentive program by identifying an average payback period and then linking it to its respective market acceptance using one of the relationships outlined here.

APS' Energy Efficiency Market Potential Study, conducted by ICF International and completed in 2007, established a payback acceptance curve for non-residential customers based on survey responses of commercial and industrial customers that were conducted in 2005 and 2006. The relationship is displayed in green in Figure 3-1. As identified in the study, "customers' reported payback acceptance can differ considerably from their actual purchasing behavior."[8] To build on these results, Summit Blue conducted research into other studies concerning market acceptance of energy efficiency technologies.

Figure 3-1: Payback Acceptance Curves



The Arizona Solar Electric Roadmap Study conducted for the Arizona Department of Commerce by Navigant Consulting in January 2007 serves as the primary source for establishing a relationship between payback of energy efficiency technology and market acceptance. The research presents two curves, one from a 1982 study conducted by Kastovich[9] on the electric heat pump market, and a less aggressive curve established by Navigant[10] in 2007. These are labeled in red and blue, respectively, in Figure 3-1. The average of these curves can be estimated using the simplified method displayed in Equation 3–1.

[8] ICF International. *Arizona Public Service: Energy Efficiency Baseline Study*. September 2006. Pg 152.

[9] J.C. Kastovich et al. *Advanced Electric Heat Pump Market and Business Analysis*. April 1982. Figure 2.1-1 "Consumer acceptance of added system cost." Pg. 7.

[10] The curve presented in the roadmap study is similar to the payback/acceptance relationship presented in Figure 8 of the *Rooftop Photovoltaics Market Penetration Scenarios* compiled by Navigant Consulting for Residential and Commercial New Construction. However, it is not cited as a direct source.

Equation 3–1: SBC Estimate of Payback Acceptance

$$MP = e^{(-WF*PB)}$$

Where *MP* is the percent of market acceptance for EE technology, *WF* is a unit-less weighting factor and *PB* is the payback period in years. The weighting factor can be adjusted to simulate aggressiveness based on other market factors. Higher aggressiveness implies longer payback periods and is simulated using lower weighting factors. The average of the Navigant and Kastovich curves are estimated using a weighting factor of 0.3 and is displayed in orange in Figure 3-1. This "average" curve was used to determine payback acceptance rates of distributed renewable energy in a December 2008 report compiled for APS, and is identified going forward as the "APS Renewable" estimate. This provides a more aggressive curve when compared to that estimated by ICF, which has a weighting factor closer to 0.4.

At this point, surveys are being conducted with APS "Solutions for Business" participants, as well as non-participants, to determine how economic factors affect payback criteria. These surveys should be completed within the coming year. In the meantime, Summit Blue simulated such effects using the exponential relationship defined in Equation 3–1. Although, this does not provide specific relationships to other market factors, it allows for flexibility in the overall analysis.

3.3 Custom Incentive Program Analysis

The Solutions for Business database provides non-coincident and coincident demand savings, on and off peak energy savings, and incremental measure costs for each custom project. These values were aggregated by program year and measure type and input into the existing measure analysis spreadsheet (MAS) to calculate paybacks and benefit cost ratios for the custom projects completed to date. APS' current incentive structure of $0.11/kWh with a cap of 50% of incremental costs yields a customer payback of 2.5 years and a Total Resource Cost (TRC) score of 2.67. This translates to acceptance rates of 35%, 23%, and 48% for the payback acceptance curves of ICF, Navigant, and APS Renewable respectively. In this analysis, the ICF curve is considered standard market acceptance, while the Navigant and APS Renewable curves represent conservative and aggressive markets, respectively. The Kastovich model is not incorporated, as it was created for heat pumps specifically, as well as represents attitudes from over 25 years ago, which may now be outdated. Thus, the customer payback currently being realized through the custom incentive of 2.5 years is not reaching APS' goal of two years or less and not reaching the goal where most customers would choose to participate in these projects (>50% acceptance).

The desired market acceptance level for the custom incentive program is 50%,[11] which is more in line with APS' goal of a two year payback for custom incentive projects. To determine an effective incentive structure, a parametric analysis was conducted for a range of incentive levels, while maintaining the 50% of incremental cost cap for different payback acceptance curves. The results are displayed for the three scenarios in Figure 3-2.

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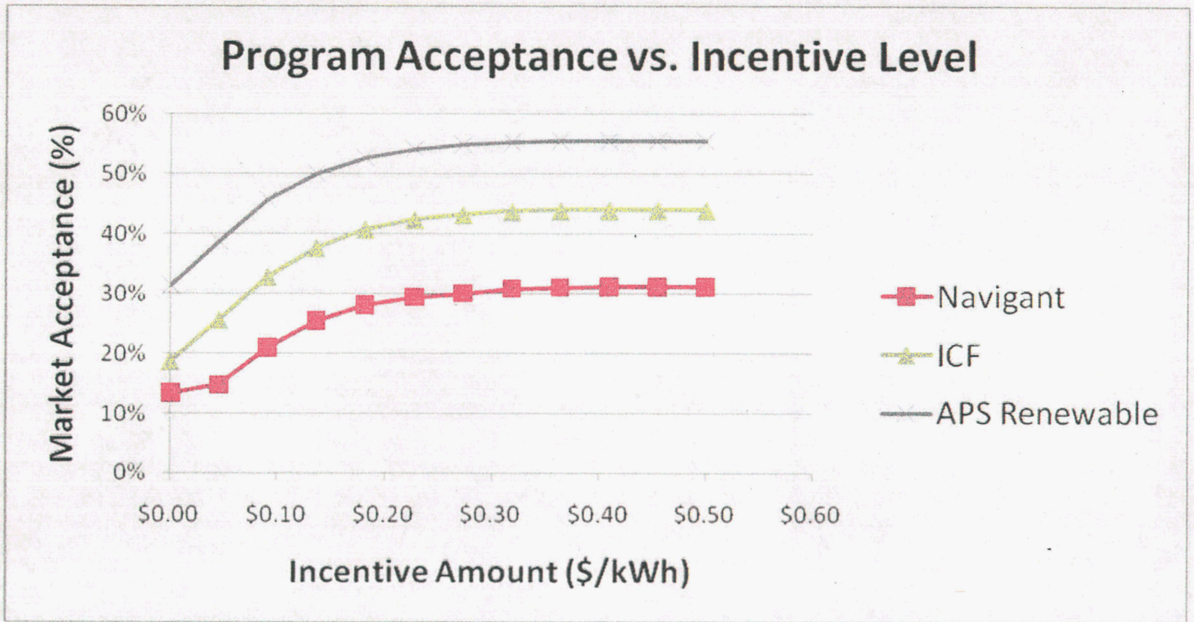
[11] Assuming a standard S-shaped diffusion curve and 100% technical market potential for the custom incentive program, the goal of 50% market acceptance signifies the midpoint between program growth and program saturation. Furthermore, this is the rate at which market diffusion is increasing most rapidly. Thus, a market acceptance of 50% is deemed an appropriate goal.

Figure 3-2: Market Acceptance vs. Incentive Amount (2006-2008: Cap = 50%)



For a cap of 50% of incremental cost, only the APS Renewable estimate is capable of achieving the desired level of market acceptance. The resulting incentive amount to achieve this level is between $0.12/kWh and $0.13/kWh. The more conservative estimates never achieve the desired acceptance level, due to the 50% incremental capacity cap, implying that the incentive level and capacity cap should be adjusted to achieve a market acceptance rate of 50%. Therefore, a second parametric analysis was conducted where both incentive amount and payment cap were varied. Figure 3-3 shows the variance in market acceptance as a function of incentive amount and payment cap using the ICF payback acceptance curve. The ICF payback acceptance curve best suits this analysis by providing a midpoint between the conservative Navigant curve, and the aggressive APS Renewable curve. In addition, it is most representative of this market, as the study pertains specifically to APS.

Figure 3-3: Market Acceptance vs. Incentive Amount/Payment Cap (ICF) ($0.10/kWh to $0.15/kWh)

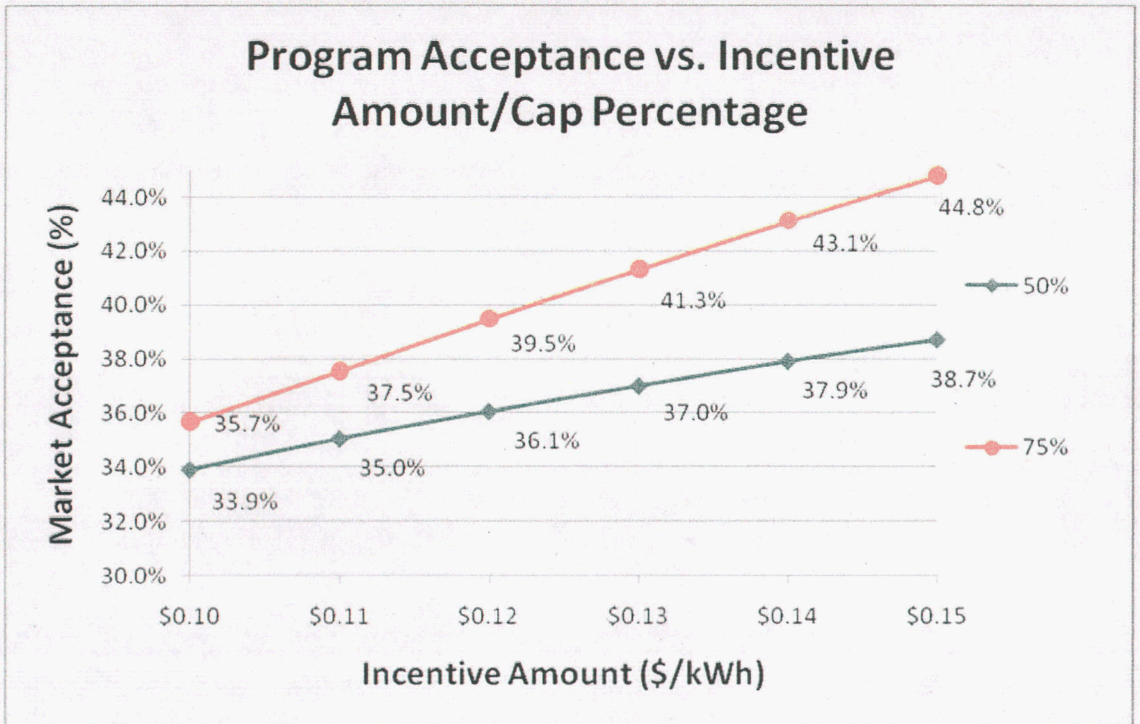
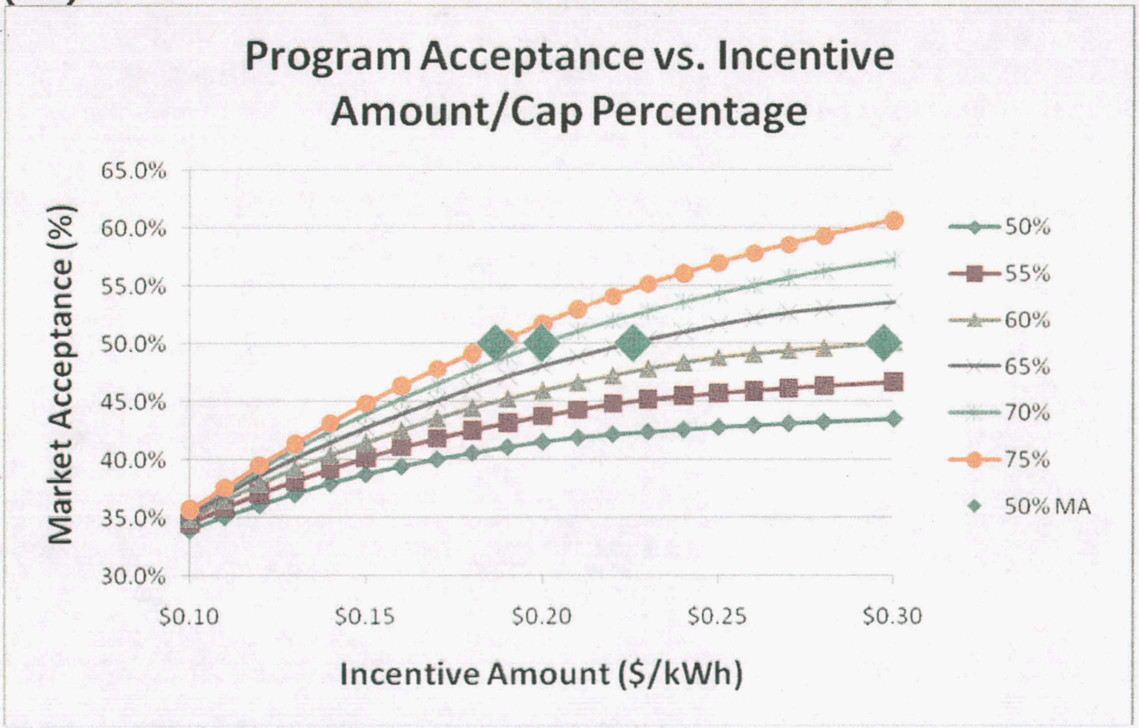


Figure 3-3 shows how market acceptance varies for incentive levels ranging from $0.10/kWh to $0.15/kWh, for caps of 50% and 75% of incremental cost. This shows that for a 50% cap, market acceptance only increases 4.8% from 33.9% to 38.7%, as the incentive level increases. However, for a 75% cap, market acceptance rises 9.1% from 35.7% to 44.8%. This shows that raising the cap level will provide a 2.5% increase in market acceptance rate at the current incentive level of $0.11/kWh. In addition, lowering the incentive level will reduce market acceptance by 1.1%. Neither the 50% nor 75% cap achieves the desired market acceptance of 50%, suggesting that the incentive level must be increased to obtain this level of market penetration. Figure 3-4 shows the same analysis, but with incentive levels ranging from $0.10/kWh to $0.30/kWh. Green diamonds identify incentive structures that achieve the desired market acceptance.

Figure 3-4: Market Acceptance vs. Incentive Amount/Payment Caps (ICF)



In summary, this analysis shows that the current incentive structure of $0.11/kWh with a cap of 50% of incremental cost does not achieve the desired market acceptance rate of 50% for the Navigant, ICF, and APS Renewable payback acceptance curves. Furthermore, using the moderate ICF payback acceptance curve, market acceptance is limited to 44%, due to the incentive limitation of 50% of total incremental cost. As a result, it is recommended to increase both the incentive rate and cap in order to achieve the desired market penetration.

If it is determined that a market penetration of 50% is not the ultimate goal of the custom incentive being offered at this time, then the data presented here would support maintaining the current incentive level of $0.11/kWh, at a minimum. This level is also consistent with SRP's custom incentive payment, which is reflective of APS' service territory, given that they are aligned back-to-back around the Phoenix Metro area and serve like customer bases.

4 COMPREHENSIVE BUILDING DESIGN

The APS Solutions for Business new construction program currently offers a custom incentive of $0.11/kWh. This custom incentive can be either applied to energy savings related to a specific building system outside the current prescriptive measures, or a comprehensive building performance approach using the ASHRAE 90.1 energy standard as a baseline.

The analysis presented in this section is intended to provide some background material and a preliminary analysis to support the option of migrating the new construction custom incentive toward a progressive or tiered approach in future revisions to the Solutions for Business Program. Future revisions to the program may also consider incentives for both the building owner and the design team. Unless building owners recognize that additional effort is required to examine alternative energy efficient designs on the part of their design teams, and unless design professionals are compensated for their time these alternatives will rarely be considered. It is common practice that the same typical or standard design approaches is adopted from project to project and that high efficiency alternaitves to standard practice are typically not analyzed.

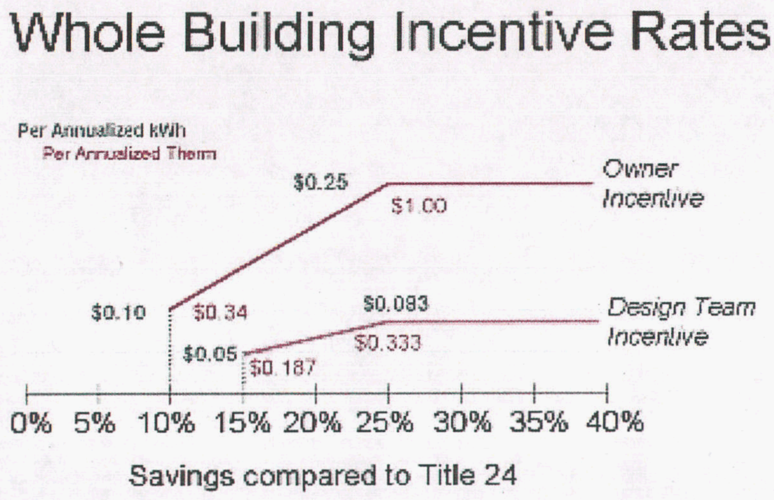
4.1 Review of the Savings by Design Program

In addition to the analysis discussed above, research was conducted regarding alternative incentives for projects employing energy efficient whole building designs, including incentives with two or more levels. The *Savings by Design*[12] program offered by five California utilities (Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, Southern California Gas, and Sacramento Municipal Utility District), provides an example of such an incentive offering. The program offers two incentives to owners and design teams, in addition to design assitance for new construction or major renovation commercial projects. Incentives are only offered for those projects achieving savings when compared to Title 24 standards (the California energy code). The incentive structure is based on which design approach is implemented, either system specific (i.e., lighting, HVAC) or whole building design. For system specific design, only owner incentives are offered, while both incentives are offered for whole building design. This discussion will focus on the whole building design approach.

The whole building approach optimizes energy consumption by integrating the design of the building envelope, HVAC systems, and lighting systems. Such an approach requires building simulation tools to calculate total energy consumption for the planned building and its respective baseline. The program offers assitance and access to such tools. The incentive offered for whole building design is based on a per kWh or Therm saved basis. Owner and design team incentives are offered for buildings realizing energy savings of 10% and 15% or greater, respectively. The incentive structure is best depicted in Figure 4-1.

Figure 4-1: Incentive Structure for Whole Building Design (Source: Savings by Design)

[12] www.savingsbydesign.com



4.2 Analysis Methodology

An analysis to determine the cost effectiveness of offering a progressive or tiered incentive for Comprehensive Building Design (CBD) was conducted. The analysis is modeled after the Savings by Design program using the following assumptions:

- A project must exceed ASHRAE 90.1-2004 energy standards, rather than Title 24 (California Building Code).
- A progressive incentive structure of $0.01 for each percent savings above an ASHRAE 90.1-2004 baseline building.

This section will provide a description of the assumptions and sources for estimated energy and demand savings and the incremental costs associated with exceeding ASHRAE 90.1-2004.

4.2.1 Energy and Demand Assumptions

The U.S. Department of Energy provides a quantitative analysis[13] of the energy intensities (i.e., kBtu/sq ft) as part of their determination that ASHRAE 90.1-2004 achieves greater efficiency than the 1999 standard. The intensities for all building types in Phoenix, AZ were extracted and used for baseline energy consumption. Unfortunately, only energy intensities were provided, therefore, demand intensities needed to be derived. The ratios of demand intensity to energy intensity for each building type was sourced from APS' End Use Data Acquisition Project (EUDAP) completed in 1994, and used to calculate baseline demand intensity. The analysis is presented in Table 4-1 along with each building types weighting factor, also sourced from the EUDAP results.

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[13] DOE Quantitative Analysis of ASHRAE Standard 90.1 - 1999 and 2004 for PHX http://www.energycodes.gov/implement/determinations_com_exp04.stm.

Table 4-1: Energy Intensities, Intensity Ratios and Weighting Factors

	Electric[14]		Gas[15]		Intensity Ratio[16]	Weighting Factor[17]
Bldg Type	**kBtu/sq ft**	**kWh/sq ft**	**kBtu/sq ft**	**Therms/sq ft**	**kW/kWh**	**by Sq Ft**
Assembly	51.29	15.03	15.54	0.16	0.000282	0.042
Education	29.75	8.72	10.69	0.11	0.000186	0.114
Food Service	95.95	28.11	18.61	0.19	0.000197	0.075
Lodging	32.93	9.65	6.04	0.06	0.000149	0.055
Office	38.80	11.37	2.68	0.03	0.000252	0.384
Retail	40.44	11.85	1.88	0.02	0.000282	0.287
Warehouse	13.67	4.01	6.39	0.06	0.000149	0.042

4.2.2 Cost Assumptions

Incremental costs for exceeding ASHRAE 90.1-2004 standards are difficult to quantify. The standard does not specify a single building construction, and therefore, the same exact building may perform differently based on factors such as orientation, operating schedule, and sector. Therefore, depending on the building, energy savings can be achieved a number of ways, each with their own incremental costs. An in depth cost study falls outside the scope of this analysis, however, a high-level approach was conducted to estimate incremental costs based on energy consumption below ASHRAE 90.1-2004 standards. This section outlines the approach and its assumptions.

Baseline project costs by building type were sourced from RS Means Cost Work 2008 software for Phoenix, AZ. High, medium, and low estimates were sourced and are displayed in Table 4-2.

[14] Sourced from DOE Quantitative Analysis for ASHRAE 90.1 – 2004 for PHX.

[15] Ibid.

[16] Sourced from EUDAP analysis.

[17] Ibid.

Table 4-2: Baseline Costs by Building Type (Source: RS Means CostWorks 2008)

	Cost per Sq Ft		
Bldg Type	**Low**	**Median**	**High**
Assembly	91	118	148
Education	85.5	107	130
Food Service	110	142	186
Lodging	58.5	84.5	110
Office	81.5	99	131
Retail	51.5	69.5	92
Warehouse	34	50	71.5

With baseline costs defined, a relationship needed to be established linking energy savings to incremental costs. Energy intensities and incremental costs for baseline and LEED certified, silver, gold, and platinum were identified. LEED buildings were deemed appropriate models of comprehensive building design, as they consistently achieve energy savings over ASHRAE and are products of integrated building concepts. The energy intensities, percent savings, and a range of incremental cost percentages for LEED buildings are displayed in Table 4-3.

Table 4-3: Energy Intensities and Incremental Costs for LEED buildings

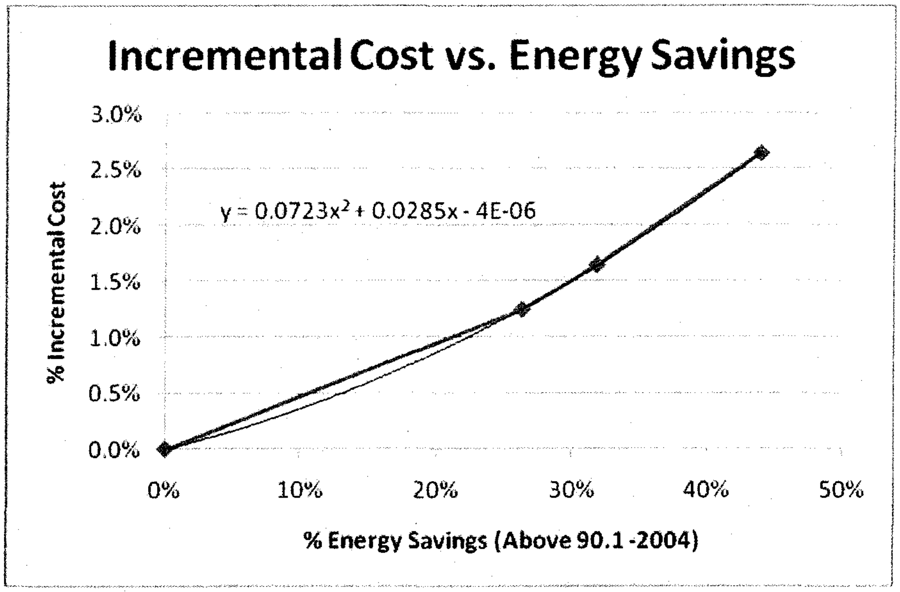
LEED	Energy Intensities[18]		% Incremental Costs[19]		
Rating	kBtu/sf	% savings	Low	Median	High
CBECS	91	0%	0.0%	0.0%	0.0%
Certified	67	26%	0.0%	1.3%	2.5%
Silver	62	32%	0.0%	1.7%	3.3%
Gold	51	44%	0.3%	2.7%	5.0%
Platinum	51	44%	4.5%	6.5%	8.5%

The incremental percentages do not reflect specific energy-related costs, however. LEED costs also include "soft costs," such as administration, commissioning, and LEED certification fees. In addition, costs for non-energy features, such as water management, land reclamation, and building location are lumped into these costs. It is assumed that the "high" estimate accounts for all factors. The median values are used for this analysis, as it is believed that they best represent the incremental costs for energy-related features in a building. These values are used to determine a relationship linking energy savings to incremental costs, displayed in Figure 4-2.

[18] Energy intensities for baseline and LEED buildings are sourced from "Energy Performance of LEED for New Construction Buildings" (http://www.usgbc.org/ShowFile.aspx?DocumentID=3930). Baseline intensities for all building types are sourced from the Commercial Building Energy Consumption Survey (CBECS), which was also used in the DOE determination analysis.

[19] Incremental costs are sourced from "Measuring the Cost to Become LEED Certified." (www.facilitiesnet.com/Green/article/Measuring-The-Cost-To-Become-LEED-Certified--10057).

Figure 4-2: Incremental Costs vs. Energy Savings



4.3 Results

APS currently offers the custom incentive of $0.11 for new construction projects, as well as projects for existing facilities. The following analysis shows that a progressive or tiered custom incentive for new construction could be cost-effective in APS' service area.

A parametric analysis was conducted to identify how energy savings (% below ASHRAE 90.1-2004) affect the TRC and Market Acceptance. The weighting factors from Table 4-1 were applied to each building type to produce a "Program Wide" average. Figure 4-3 displays the results of the TRC analysis. This shows that, as incentive amount and energy savings go up, the TRC decreases. This may seem counter-intuitive, as greater energy savings often imply higher TRCs. However, incremental costs increase at a greater rate for higher levels of savings, causing the TRC to decrease. Nonetheless, the program remains cost-effective as the TRC is consistently well above 1.00.

Figure 4-3: Total Resource Cost Tests for Incentive Amounts/Energy Savings

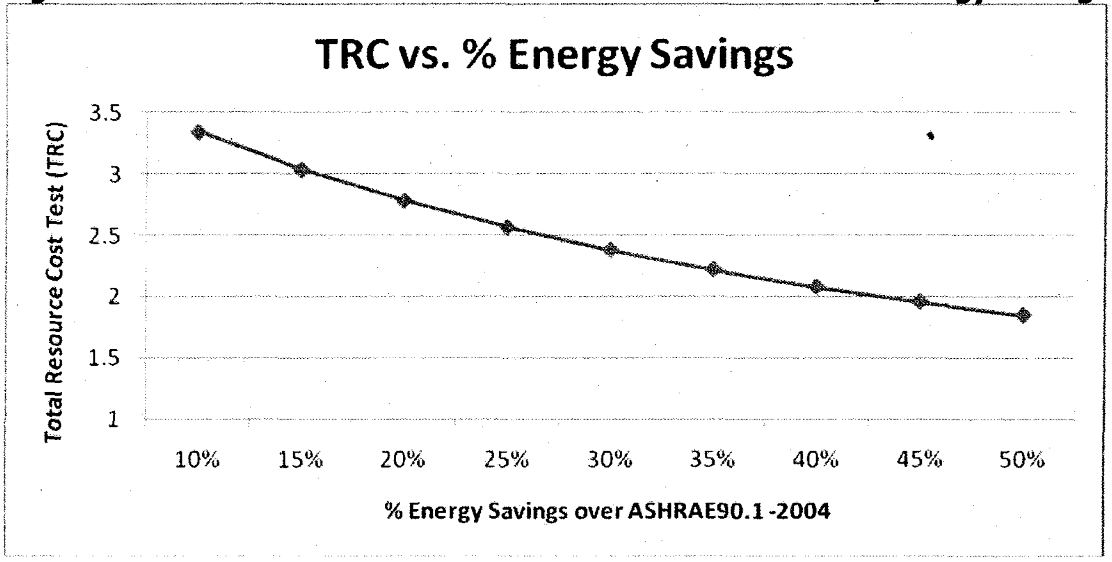
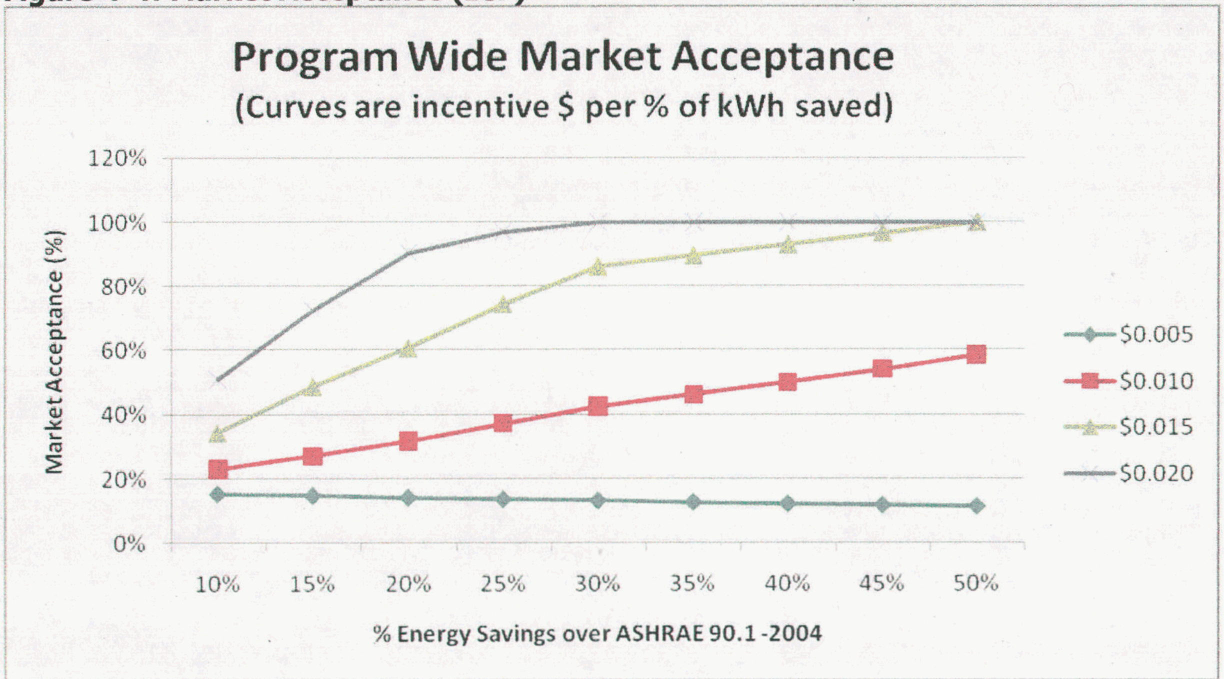


Figure 4-4 displays the results of the parametric analysis on market acceptance using the ICF estimated curve. The graph shows the effect of progressive incentive system similar to the SBD system on market acceptance at differnet savings levels (a progressive incentive providing a $ per % increase in savings above the baseline). The graph shows that, as expected, greater incentive amounts increase market acceptance due to decreased payback periods. All incentive levels show that market acceptance increase with energy savings, with the exception of $0.005 per % kWh saved. This is due to the same reason that the TRC decreases with increased energy savings, namely the incremental costs outweigh the energy savings. Therefore, it can be concluded that an incentive level of at least $0.01 per % kWh saved is necessary to have a positive impact on market acceptance. Furthermore, if looking to achieve a market acceptance of 50%, an ideal incentive amount is between $0.01 and $0.015 per % kWh saved, based on the assumption that most buildings are capable of achieving between 20% and 30% savings. This is comparable to a LEED certified building.

Figure 4-4: Market Acceptance (ICF)



5 CONCLUSIONS AND RECOMMENDATIONS

The following are conclusions resulting from this analysis.

- The APS custom incentive level is on par with other utilities in the state and with several of the major utilities in California. On average it is also within range compared to other custom incentives offered around the country.

- The current incentive structure of $0.11/kWh saved without exceeding 50% of the incremental cost of the project has resulted in a market acceptance of 35% using the ICF estimate for market acceptance. Due to the limiting influence of the 50% cap currently in place, the actual effective paid out to customers was approximately $0.093/kWh for custom projects.

- Using the curves of ICF and Navigant, the 50% cap limitation does not allow for achievement of a 50% market acceptance by customers. To move toward 50% market acceptance, the incentive level would need to be increased and the cap would need to be raised.

- The *Savings by Design* program offered by California utilities provides a good outline for incentive offerings based on comprehensive, efficient building design with a progressive incentive offering. These guidelines could be used to expand APS' current program to provide a a progressive or tiered incentive offering.

- Analysis of a Comprehensive Building Design incentive shows beneficial TRC and market acceptance values for an array of incentive levels and energy savings.

The following recommendations are made for the custom incentive feature of the program on a going forward basis.

- If the goal is to increase market penetration toward 50% and lower the customers payback to two years or less, then the incentive for custom projects would need to be increased. However, the analysis also shows that increasing the incentive alone will not move the market sufficiently. Thus, it is also recommended that the incentive cap be increased to 75% of incremental cost at least for non-lighting projects in order to move toward a market penetration of 50% for custom projects.

- If it is preferred to not raise the incentive level, it is recommended to leave the incentive at its present level particularly in light of the current economic downturn.

- For new construction applications, it is recommended that APS develop a tiered or progressive custom incentive to promote whole building energy efficient design and construction that exceeds the ASHRAE 90.1 baseline.

- APS may also want to consider the option of providing incentives for the design team similar to the *Savings by Design* program. These incentives are used to offset the additional time and effort required by design professionals incurred when assessing altnertive high efficiency design options.

Appendix A Custom Program Features Summary

A.1 Arizona Custom Incentive Programs

The three utilities reviewed in the Arizona market are Arizona Public Service (APS), Tucson Electric Power (TEP), and Salt River Project (SRP). They are similar in incentive levels and eligibility requirements. All custom incentive levels are within $ 0.01/kWh of each other and all three utility programs serve both the retrofit and new construction markets. Only TEP has a customer demand requirement of greater than 200 kW. All utilities require a passing TRC test and documentation from its customers on projected and actual savings. The program characteristics for Arizona utilities are listed in Table A-1.

Table A-1: Arizona Custom Incentive Programs

Service Provider	Program Name	Incentive Structure ($/kWh)	Eligibility[20]	Limitations	Terms & Conditions[21]
Arizona Public Service[22]	Solutions for Business	$ 0.11	Retrofit, major renovation, new construction	"Other" incentives / rebates reduce incremental measure costs per ACC 70637 and may be taxable	Energy savings sustainable for five (5) years or for the products lifetime
Tucson Electric Power[23]	Commercial Business Solutions	$ 0.10	Large Business Program with demand greater than 200 kW	"Other" incentives / rebates reduce incremental measure costs and may be taxable	Energy savings sustainable for five (5) years
Salt River Project[24]	PowerWise Custom Business Solutions	$ 0.11	Retrofit, New Construction	Measures must produce verifiable savings without increase in summer peak demand usage	

[20] All Programs require measures to pass the Total Resource Cost (TRC) test.

[21] Estimates and documentation of savings is required for all programs, and may be subject to pre-post inspections and metering.

[22] APS Solutions for Business Policies and Procedures Jan. 30, 2009.

[23] Commercial Energy Solutions from Tucson Electric Power, Large Business Program, New Construction Business Program Policies and Procedures, Nov. 3, 2008.

[24] SRP PowerWise Custom Business Solutions Program Manual, June 9, 2008.

A.2 California Custom Incentive Programs

Summit Blue examined the custom incentive programs for five California utilities, including San Diego Gas & Electric (SDG&E), Pacific Gas & Electric (PG&E), Southern California Edison (SCE), Sacramento Municipal District (SMUD), and Los Angeles Department of Water and Power (LA – DWP).

The incentive structures for the California utilities researched were more complex. For instance, incentives were broken out by measure type (i.e., lighting, HVAC) and in some cases, further defined by efficiency tiers (i.e., HVAC I and HVAC II). In addition, incentive levels are offered for both energy and demand savings. The energy and demand incentive levels for each utility and measure type are defined in Table A-2 and Table A-3, respectively.

Table A-2: Energy Incentive for California Utilities ($/kWh)

	SDG&E[25]	PG&E[26]	SCE	SMUD	LA - DWP
Lighting	$0.07	$0.05	$0.05	$0.06	$0.05
A/C & Refrigeration	$0.20	$0.15	$0.14	$0.08	$0.14
Other	$0.10	$0.09	$0.08	$0.08	$0.08
Natural Gas	$0.80	$1.00	N/A	N/A	N/A

Table A-3: Demand Incentives for California Utilities ($/kW Saved)

	SDG&E	PG&E	SCE	SMUD	LA - DWP
Lighting	N/A	$100	N/A	N/A	N/A
A/C & Refrigeration	N/A	$100	N/A	$200	N/A
Other	N/A	$100	N/A	$100	N/A
Natural Gas	N/A	N/A	N/A	N/A	N/A

In order to draw a comparison to the flat $/kWh incentive structure of the Arizona utilities, the demand savings incentives are converted to $/kWh values. This is accomplished using Equation A–1, where $/kWh is the effective $/kWh value, $/kW is the demand incentive, and LF[27] is the load factor for a given measure type. The converted values are listed in Table A-4 and the cumulative values accounting for demand and energy incentives are listed in Table A-5. Cumulative incentive values, depicted in Table A-5, are produced by summing the results listed in Table A-4 with the energy incentives of Table A-2, and performing a weighted average by measure type.[28]

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[25] Applies to SDG&E's "Energy Savings Bid Program."

[26] SDG&E's "Standard Performance Contract Program" has the same incentive structure as PG&E's "Non-Residential Retrofit Demand Response Program."

[27] Load Factors are calculated from DEER 2005 energy simulations. It is assumed that load factors are 31%, 39%, and 32% for "Lighting," "AC & Refrigeration," and "Other," respectively.

[28] Assumed weightings for Lighting, A/C and Refrigeration, and Other are 50%, 20%, and 30%, respectively, based on the distribution of APS custom projects by measure type.

Equation A–1: Demand Incentive Conversion Equation

$/kWh = $/kW(1/LF)*(1/8760)*

Table A-4: Demand Incentives Converted to $/kWh

	SDG&E	PG&E	SCE	SMUD	LA - DWP
Lighting	N/A	$0.04	N/A	N/A	N/A
A/C & Refrigeration	N/A	$0.03	N/A	$0.06	N/A
Other	N/A	$0.04	N/A	$0.04	N/A
Natural Gas	N/A	N/A	N/A	N/A	N/A

Table A-5: Cumulative Demand and Energy Incentive Values in $/kWh

	SDG&E	PG&E	SCE	SMUD	LA - DWP
Lighting	$0.07	$0.09	$0.05	$0.06	$0.05
A/C & Refrigeration	$0.20	$0.18	$0.14	$0.14	$0.14
Other	$0.10	$0.13	$0.08	$0.12	$0.08
Natural Gas	$0.80	$1.00	N/A	N/A	N/A

Eligibility requirements were generally broad and included most of the non-residential market sectors, including business, commercial, industrial, and agricultural. Only SDG&E and SMUD listed demand requirements. The Southern California utilities, PG&E, SCE, and SDG&E, had same or similar limitations for paid incentives based upon the measured performance of the project's energy savings. Documentation of energy savings, pre-post inspections and M&V activity, was a required part of most all of these custom incentive programs. Program specifics are listed in Table A-6.

Table A-6: Eligibility and Limitations for CA Utilities Custom Incentive Programs

Program Information	Program Name	Eligibility	Limitations	Terms & Conditions
San Diego Gas& Electric[29]	Energy Savings Bid Program Standard Performance Contract Program	*Standard Performance Contract Program*: All commercial, agricultural, industrial customers, *Energy Savings Bid Program*: All non residential customers except new construction, co generation or fuel switching Pass TRC test Minimum annual savings requirements: *Electric projects* 500,000 kWh *Gas projects* 25,000 therms	Incentives paid on performance (as determined by M&V) can vary between 0-100% of contracted amount Retrofit equipment must be operating	Energy savings must exceed government standards and be sustainable for five (5) years Required estimate of energy savings review by SDG&E engineering group Required M&V process for documentation of savings Required pre-post inspections, metering
Pacific Gas & Electric[30]	2009 Non-Residential Retrofit Demand Response Program	All business customers who are customer of PG&E, SCE, SoCal Gas, or SDG&E, and pay PPP surcharge on gas or electric they receive	Incentives paid on performance (as determined by M&V) Incentives can vary between 0-100% of contracted amount. Measures cannot overlap other incentive programs (including other CA utility programs)	Energy savings must exceed government standards and be sustainable for five (5) years Baseline equipment must be decommissioned Required M&V process for documentation of savings Required pre-post inspections, metering

[29] San Diego Gas & Electric; 2009 Energy Savings Bid Program and 2009 Standard Performance Contract Program brochure downloads from utility website (www.sdge.com).

[30] Pacific Gas & Electric 2009 Nonresidential Retrofit-Demand Response Procedures Manual, Jan. 1, 2009 Program Manual, June 9, 2009.

Southern California Edison[31]	Standard Performance Contract Program	All non residential, commercial, industrial and agricultural customers who are customers of PG&E, SCE, or SDG&E and pay PPP surcharge on gas or electric they receive	Incentives paid on performance (as determined by M&V) Incentives can vary between 0-100% of contracted amount. Measures cannot overlap other incentive programs (including other CA utility programs)	Energy savings must exceed government standards and be sustainable for five (5) years Baseline equipment must be decommissioned Required M&V process for documentation of savings Required pre-post inspections, metering
Sacramento Municipal Utility District[32]	Customized Incentives Program	Projects eligible for electrical demand (kW) incentives must reduce electrical demand for at least one hour daily w/in the hours of 4-7 PM. Summer weekdays:		
Los Angles Dept. of Water & Power[33]		All Non Residential Customers in good standing	Non- CLEO lighting measures are eligible	

A.3 Other Incentive Programs

Summit Blue reviewed other custom utility measures beyond Arizona and California. Incentive structures reviewed vary. For instance, Nevada Power/Sierra Pacific offers $0.10/kWh for on-peak savings and $0.05/kW for off-peak savings. Summit Blue estimates this to be $0.066/kWh, assuming 33% of savings occur during on-peak hours. Xcel Energy in Colorado only offers demand incentives at a rate of $200/kW, which translates to $0.07/kWh effectively. Commonwealth Edison (ComEd) offers a flat rate of $0.07/kWh. Incentive levels are higher in the Northeast, with incentives ranging from $0.12/kWh in upstate New York to $0.16/kWh in New York City. The Massachusetts-based utility NSTAR, only offers demand incentives at tiers of $0.40/W and $0.80/W.

Generally, all programs examined had common threads of unrestrictive eligibility requirements, a focus on system efficiency for kWh savings, documented five year sustainable project savings and pre- and post-inspections that could include M&V activity. Program specifics for these utilities are listed in Table A-7.

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[31] Southern California Edison Business Incentives & Contract Program, 2008 SPC Procedures Manual.

[32] Sacramento Municipal Utility District Customized Incentives Program brochure , application forms from utility website (www.smud.org).

[33] Los Angeles Dept. of Water & Power, brochure download from utility website (www.ladwp.com).

Table A-7: Other Custom Incentive Programs

Program Information	Program Name	Incentive Structure	Eligibility	Limitations	Terms & Conditions
Nevada Power (South) Sierra Pacific (North)[34]	Sure Bet Energy Efficiency Program	$0.10/kWh on peak $0.50 off peak	Retrofit, major renovation, new construction Non-residential customers Minimum annual savings of 2,000 kW required to submit application	Measures must reduce KWh due to improvement in system efficiency	Improvements must result in permanent reduction in overall kWh. Project savings must be sustainable for 5 yrs Estimate and Documentation of savings Possible pre- post inspections, M&V metering
Xcel Energy (CO)[35]	Custom Efficiency Program	$200/kW	Xcel Colorado business gas & electric customers	Measures must reduce KWh due to improvement in system efficiency Measures allowed include: compressed Air, controls, cooling & heating concepts, cooling & heating equipment, lighting, miscellaneous electric equipment	Possible pre- post inspections, M&V metering
Commonwealth Edison (IL)[36,37]	Smart Ideas for your Business Program	$0.07/kWh	You must be a non-residential (commercial and industrial) customer within ComEd's service territory.	Measures must reduce KWh due to improvement in system efficiency Customers may not apply for energy efficiency incentives from ComEd and DCEO[38] for the same project or measure.	Improvements must result in permanent reduction in overall kWh. Project savings must be sustainable for 5 yrs

National Grid	Design 2000 plus			Incentives based on actual costs Projects must	Project requires engineering and evaluation of costs and savings
NSTAR[39]	Construction Energy Solutions Program: Performance Lighting Program Tier I, Tier II	Tier I \$ 0.40/ watt saved Tier II \$ 0.80 / watt saved	Commercial, Industrial, Construction	Must meet LPD requirements New Construction or substantial renovation projects	All removed equipment eliminated from resale market and disposed of properly
NYSERDA	ENERGY Smart Program Existing Facilities' Program / New Construction	\$ 0.12 kWh Upstate NY / \$ 0.16 kWh Con Edison	Non-residential customers of multiple electric distribution companies	NYSERDA to review non standard custom measure for incentive eligibility	All removed equipment eliminated from resale market and disposed of properly Required M&V process for documentation of savings

[34] Nevada Power / Sierra Power Sure Bet Policies and Procedures 2008.

[35] Xcel Energy Custom Efficiency document downloads from website (www.xcelenergy.com).

[36] Commonwealth Edison Smart Ideas for your Business Program document downloads from website (www.comed.com).

[37] ComEd is currently between programs.

[38] DCEO Illinois Dept. of Commerce and Economic Opportunity.

[39]DISRE NSTAR Construction Energy Solutions Program Summary downloads from website (www.dsireusa.org).

[25] Incentives for Implementing Energy Savings Technologies, Kevin Keena Power Point Presentation download from website: *www.turi.org/content/download/5127/56460/file/**National%20Grid**.ppt.*

Appendix B INDIVIDUAL MEASURE ANALYSIS

B.1 Program Summary

Each project was categorized into one of eight measure groups: Compressed Air, Energy Management Systems (EMS), Envelope, HVAC, Refrigeration, Transformers, Lighting, and Food Prep. The distribution of projects by year and measure type is displayed in Table B-1. This shows that lighting retrofits far outweigh the other measure types, accounting for 59% of all custom projects. Food preparation, refrigeration, HVAC, and EMS measures account for most of the remaining projects.

Table B-1: Custom incentives by Measure Type

	2006	2007	2008	Total	% of Total
Compressed Air	0	2	2	4	1%
EMS	0	17	12	29	8%
Envelope	0	0	3	3	1%
HVAC	1	16	14	31	8%
Refrigeration	0	31	0	31	8%
Transformers	0	8	0	8	2%
Lighting	21	104	98	223	59%
Food Prep	0	41	5	46	12%
Total	22	219	134	375	100%

B.2 Market Acceptance and TRC Analysis

Each measure from the Solutions for Business database was categorized into eight broad measure groups mentioned above. The same methodology used for all measures was then conducted for each measure group. The payback periods, TRCs, and market acceptance levels by measure group are listed in Table B-2. The results show that Envelope, Compressed Air, Food Preparation, and Refrigeration measures are the most cost-effective with paybacks of two years or less, and thus, have the highest market acceptance levels. However, these only account for 22% of the total custom projects. Lighting on the other hand, accounts for 59% of all measures, but has a payback of 2.4 years. Thus, reducing the payback of lighting measures will have the largest impact on the custom incentive program as a whole. Transformers are the least cost-effective measure with a payback of 11 years. These only account for eight of the 375 measures however, and were only present in 2007.

Table B-2: Current Custom Incentive Analysis by Measure Group

Measure Group	Payback w/Incentive	TRC	Market Acceptance		
			ICF	Navigant	SBC
Compressed Air	1.9	3.85	45%	33%	57%
EMS	3.8	1.66	19%	13%	32%
Envelope	1.5	4.13	55%	46%	65%
HVAC	2.7	1.53	31%	19%	44%
Refrigeration	2.0	2.26	43%	30%	55%
Transformers	11.0	1.29	1%	1%	4%
Lighting	2.4	2.92	36%	24%	49%
Food Prep	1.9	3.54	46%	34%	57%
Total	2.5	2.67	35%	23%	48%

A parametric analysis of incentive level by measure type was carried out for the ICF acceptance curve. The results are plotted in Figure B-1 for all measure types, for a cap of 50% of incremental cost. This shows that only Envelope and Food Preparation measures meet the desired acceptance levels for the current incentive structure, due to the limitations of the incentive cap. Therefore, as seen in the analysis of all measures combined, it may be worthwhile to increase the incentive cap. The parametric analysis for each measure was also run using a cap of 75% of incremental cost. The results are displayed in Figure B-2. This increases the acceptance level for all measures, with the exception of compressed air and transformers.

Figure B-1: Market Acceptance vs. Incentive Level - By Measure (50% Cap, ICF)

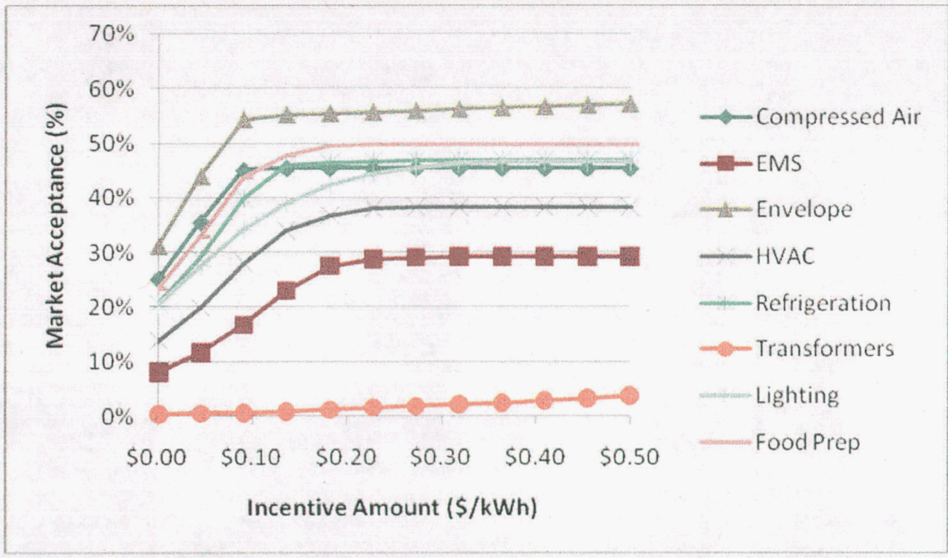
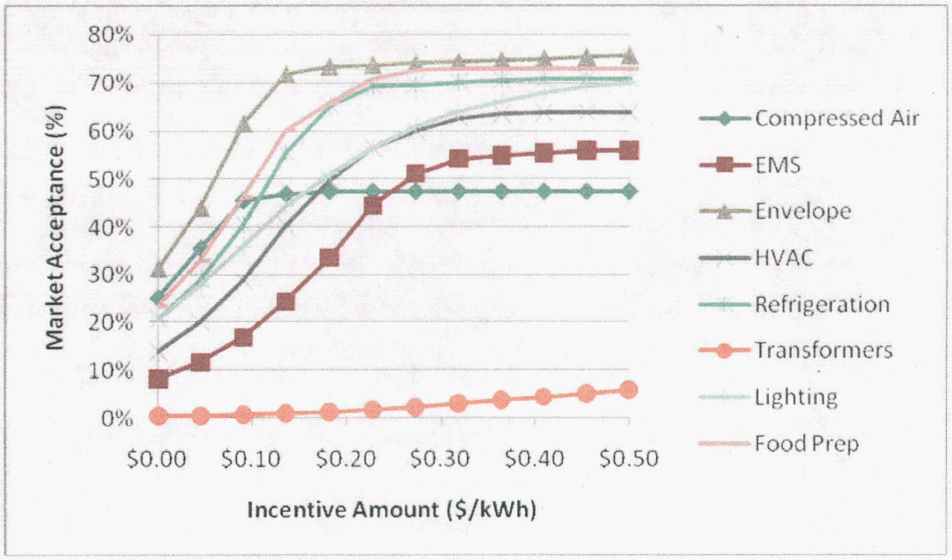


Figure B-2: Market Acceptance vs. Incentive Level - By Measure (75% Cap, ICF)



B.3 Individual Measure Analysis Conclusions

The most cost-effective measures (i.e., those with the lowest TRCs) are Envelope, Compressed Air, Food Preparation, Refrigeration, Lighting, and HVAC, with paybacks of less than three years.

With the current incentive structure, only Envelope and Food Preparation measures are capable of achieving 50% market acceptance, using ICF estimates. All measures, with the exception of Transformers and Compressed Air systems, are capable of achieving 50% market acceptance if the cap is increased to 75% of incremental costs.